National Institute of Environmental Health Sciences

Global assessment of urban heat island effect and future heat waves: GIS applications in urban climate modeling

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Abstract:

One of the well-documented problems that exist in urban areas throughout the world is heat stress. There is also evidence that, due to climate change, heat waves are expected to increase in frequency and intensity. Combined climate and demographic trends indicate that more vulnerable urban populations may be at greater risk to excessive heat stress in the future. In this presentation we will discuss a GIS application to assess human health impacts from urban climate modeling. An urban model, developed at the National Center for Atmospheric Research (NCAR) and coupled to a global climate model provides climate and climate-change information for urban environments (e.g., temperature, humidity) throughout the world. These simulations make use of global GIS datasets of urban extent, morphology, and radiative and thermal properties of urban materials developed by the University of Kansas. Model outputs from global coupled simulations of present-day climate and future climate are analyzed in a GIS with respect to the urban heat island effect, future heat waves and their impacts on urban population. Here, we will present geoprocessing techniques developed for working with the netCDF model outputs in a GIS; discuss spatial analysis of projected heat waves frequency, intensity and duration; and illustrate potential impacts of the combined effect of urban heat islands and future heat waves on urban populations through spatial integration of urban climate model and population projections.

Source: https://ams.confex.com/ams/89annual/webprogram/Paper146723.html

Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Injury

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type:

format or standard characteristic of resource

Multimedia, Review

Timescale:

time period studied

Time Scale Unspecified